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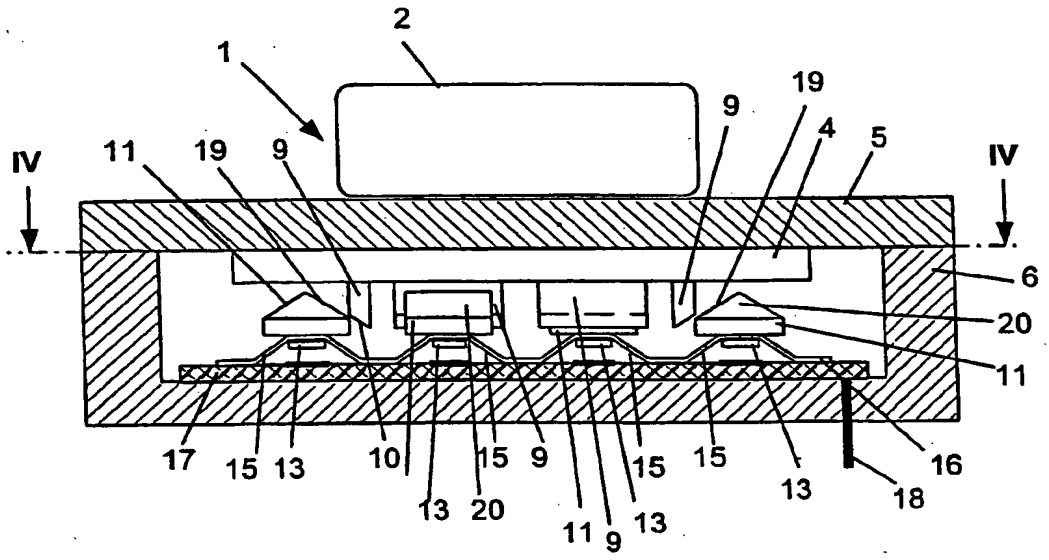
(54) Title: ELECTRIC SWITCH

(54) Bezeichnung: ELEKTRISCHER SCHALTER



(57) Abstract: The invention relates to an electric switch that comprises an actuator element (1) that is slidably disposed in a housing (6). Said actuator element, via control cams (9), impinges associated switch contacts (13) that are connected to connecting terminals (18). An actuator (11) is disposed between every control cam (9) and the associated switch contact (13), one end of said actuator being firmly mounted in the housing. The free end of said actuator impinges the switch contact (13) while the actuator (11) carries a cam (20) that corresponds to an associated control cam (9).

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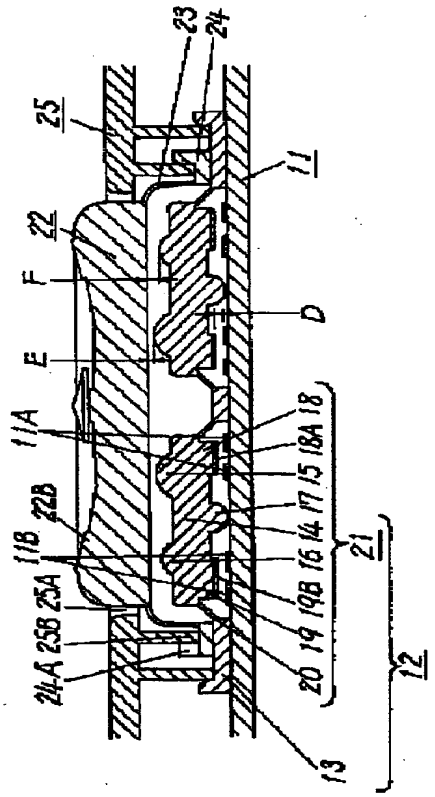
TITLE : MULTIDIRECTIONAL OPERATION SWITCH AND COMPOSITE SWITCH USING IT



ABSTRACT : PROBLEM TO BE SOLVED: To provide a multidirectional operation switch capable of securely connecting and disconnecting a snitch contact corresponding to a pressing position in relation to a multidirectional operation switch used for a variety of electronic apparatus.

SOLUTION: On the upper surface of a switch board 11 with plural sets of fixed contacts 11A, 11B radially arranged, an elastic material-made driver 12 integrally having plural movable parts 14 each provided with pressing parts 18, 19 on its lower surface corresponding to the respective fixed contacts 11A, 11B, and a central protrusion 15 and peripheral projection 16 on its upper surface is mounted, a support part 17 of which tip abuts on the switch board 11 at the middle of both the fixed contacts is formed on the lower surface of each of the movable parts 14, so that the operations of the pressing parts 18 and 19 can be made independent of each other by using the support part 17 as a fulcrum and thereby, this multidirectional operation switch can be realized which can securely connect and disconnect only an objective switch contact even if the pressing position is slightly deviated when an operation body 22 is pressed.

[JP,2000-322980,A]
* NOTICES *

CLAIMS

[Claim (s)]

[Claim 1] The multi-direction operation switch which consists of an operation object made from a spring material by which both connected with the downward heavy-gage periphery section that it was characterized by providing the following in the second connection section of the shape of an abbreviation dome of the thin meat of the periphery lower part, and this periphery section was carried on the pedestal of the above-mentioned driver The switch substrate which two or more sets of central switch contacts and the circumference switch contact which attach and detach by the press from the upper part are regular intervals from a predetermined center on top, and was arranged in the equal distance position in the shape of radiation While a heavy-gage pedestal is carried on this switch substrate, central approach on top is equipped with heavy-gage moving part in the abbreviation rectangle in which only the size more nearly predetermined than a central salient prepared the low circumference salient for the central salient in circumference approach. The supporter with which a nose of cam contacts the mid-position of the inferior surface of tongue of this moving part on a switch substrate The driver made from a spring material which has the press section which opened the lot of the above-mentioned central switch contact and a circumference switch contact, and the predetermined interval in the ends position at the bottom, and countered it, respectively, and has two or more mechanical components connected with the downward pedestal in the first connection section of the shape of an abbreviation dome of the thin meat lengthened from the periphery The whole upper surface of this driver is worn and they are the moving part of each above-mentioned mechanical component, and a predetermined interval.

[Claim 2] The multi-direction operation switch according to claim 1 connected with the pedestal by the third connection section which the upper surface is made to contact the inferior surface of tongue of an operation object, prepares the lobe of the shape of a heavy-gage pillar which can move up and down the range which does not bar operation of a mechanical component near the mechanical component of a driver, and carries out elastic buckling of the periphery lower part of this lobe by the shape of an abbreviation dome of thin meat at the time of vertical movement.

[Claim 3] The multi-direction operation switch according to claim 2 which allotted the lobe to each middle angular position of two or more mechanical components arranged in the shape of radiation.

[Claim 4] The multi-direction operation switch of any one publication of the claim 1-3 constituted by each of two or more sets of central switch contacts on a switch substrate and circumference switch contacts opening the stationary contact of a couple on a switch substrate, arranging a predetermined interval, and forming a traveling contact in the press subordinate side of the moving part of a driver at one.

[Claim 5] The multi-direction operation switch of any one publication of a claim 1-3 with which two or more sets of central switch contacts and the circumference switch contact on a switch substrate were constituted [interval / predetermined] by opening and carrying out opposite arrangement in the upper contact under a flexible insulating substrate, and the lower contact on the upper surface of an insulating substrate put on a switch substrate top or this.

[Claim 6] The multi-direction operation switch of any one publication of the claim 1-5 constituted in the shape of an abbreviation ring so that two or more sets of central switch contacts on a switch substrate might turn into a common contact.

[Claim 7] The multi-direction operation switch of any one publication of the claim 1-6 which considered switch structure of the central switch contact on a switch substrate, and a circumference switch contact as different composition.

[Claim 8] The compound switch which is characterized by providing the following and which consists of one or more push button switches The multi-direction operation switch which is a publication any one of the claims 1-7 The way mechanical component outside the shape of a heavy-gage pillar which was allotted to one or more switch contacts prepared in the way extension outside the switch substrate of this multi-direction operation switch, and each upper part of the switch contact, and was connected with the pedestal of the above-mentioned multi-direction operation switch in the fourth connection section of the shape of an abbreviation dome of the thin meat of the periphery lower part

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the multi-direction operation switch used for various electronic equipment, and the compound switch using this.

[0002]

[Description of the Prior Art] In recent years, advanced features and diversification of various electronic equipment progress, the input gestalt is changing to methods, such as determination by movement and the selection key of the cursor on a screen, the switch of the various functions to operate two or more switch contacts with one operation object as this kind of an input device is called for, and various kinds of multi-direction operation switches are proposed corresponding to this.

[0003] Such a conventional multi-direction operation switch is explained using drawing 11 - drawing 14 .

[0004] A cross section [perspective diagram / isomerism solution] when the cross section of the conventional multi-direction operation switch and drawing 12 carry out drawing 11 and drawing 13 carries out press operation of the center section of this operation object, and drawing 14 are the cross sections when carrying out press operation of the periphery of this operation object.

[0005] In this drawing, 1 is a switch substrate which has stationary-contact 1B for 4 sets of circumference switch contacts on the upper surface on the outskirts of stationary-contact 1A for the central switch contacts of a lot, and 2 is the driver laid in the switch substrate 1. Abbreviation plate-like pedestal 2A and central mechanical-component 2D which has stationary-contact 1A and traveling contact 2B which countered in the center on the inferior surface of tongue, and was connected with pedestal 2A by connection section 2C of the shape of a light-gage dome of the periphery lower part, It is arranged around this central mechanical-component 2D, has surrounding stationary-contact 1B and traveling contact 2E which countered on the inferior surface of tongue, and consists of four circumference mechanical-component 2G connected with pedestal 2A by connection section 2F of the shape of a light-gage dome of the periphery lower part.

[0006] And while it is a disc-like operation object with heavy-gage 3 and the center of the undersurface contacts the upper surface of central mechanical-component 2D It has two or more notch 3C in flange 3B the bottom, and 4 is a resin case. engagement section 3A surrounding the flank of central mechanical-component 2D for positioning, and a periphery -- projection -- It had opening 4B which makes the operation object 3 project upwards, and has two or more pillar-shaped salient 4A which engages with a rear face with notch 3C of flange 3B of the operation object 3, and a predetermined crevice.

[0007] In addition, in the normal state, the interval A of central traveling contact 2B and stationary-contact 1A is set up smaller than the sum with the interval C of the four the intervals B of traveling contact 2E and stationary-contact 1B, the undersurfaces of the operation object 3, and the upper surfaces of circumference mechanical-component 2G of the circumference.

[0008] That is, it is interval A< (interval B+ interval C).

[0009] In the above composition, from the center valve position of drawing 11 which is a normal state, if press operation of the center section of the operation object 3 is carried out at drawing 13 as an arrow shows Although connection section 2C will bend, central mechanical-component 2D of a driver 2 will move below, traveling contact 2B will short-circuit stationary-contact 1A on the switch substrate 1 and a central switch contact will be in an ON state Since the sum of an interval B and an interval C is larger than an interval A at this time, traveling contact 2E of circumference mechanical-component 2G inferior surface of tongue does not short-circuit stationary-contact 1B, and the circumference switch contact has become an OFF state.

[0010] And if the press to the operation object 3 is removed, according to the elastic stability of connection section 2C, the operation object 3 will be made central mechanical-component 2D, will move upwards, and will return to a center valve position.

[0011] Moreover, if press operation of the periphery of the operation object 3 is carried out at drawing 14 as an arrow shows While the operation object 3 is guided at notch 3C of flange 3B,

and pillar-shaped salient 4A of the above-mentioned resin case 4, and is followed on concentrating flange 3B as the supporting point and connection section 2C of central mechanical-component 2D of a driver 2 bends for a while If the periphery inferior surface of tongue of the operation object 3 contacts the circumference mechanical-component 2G upper surface opposite to a supporting-point side and presses further, the connection section 2F will bend, circumference mechanical-component 2G will move below, traveling contact 2E will short-circuit stationary-contact 1B on the switch substrate 1, and a circumference switch contact will be in an ON state.

[0012] At this time, since traveling contact 2B under central mechanical-component 2D is set up so that it may have stationary-contact 1A and a predetermined interval, stationary-contact 1A is not short-circuited and the central switch contact has become an OFF state.

[0013] And when the press to the operation object 3 was removed, it was what the operation object 3 is pushed up to central mechanical-component 2D and circumference mechanical-component 2G, moves upwards, and returns to a center valve position according to the elastic stability of the connection sections 2C and 2F.

[0014]

[Problem (s) to be Solved by the Invention] However, when having carried out press operation of the center section of the operation object 3 and a press position shifted to periphery approach, or when [even if the above-mentioned conventional multi-direction operation switch pressed the proper position,] the press force more than predetermined was applied, it had the technical problem that the both sides of stationary-contact 1A for central switch contacts and stationary-contact 1B for circumference switch contacts may be in an ON state simultaneously.

[0015] this invention solves such a conventional technical problem, and even if a press position shifts from a proper position somewhat, it aims at offering the multi-direction operation switch which can attach and detach certainly only the switch contact corresponding to the target press position, and the compound switch using this.

[0016]

[Means for Solving the Problem] In order to attain the above-mentioned purpose the multi-direction operation switch of this invention On the switch substrate which has two or more sets of central switch contacts, and a circumference switch contact The press section of the inferior surface of tongue corresponding to each switch contact, and a central salient on top, Operation of the press section is made to become independent, respectively by carrying the driver made from a spring material which has two or more moving part equipped with the circumference salient in one, and forming the supporter which contacts a switch substrate among both the above-mentioned switch contacts in the inferior surface of tongue of each moving part.

[0017] Even if the press position when carrying out press operation of the center section or periphery of an operation object allotted above the driver by this shifts somewhat, the multi-direction operation switch which makes only the meant switch contact attach and detach certainly can be obtained.

[0018]

[Embodiments of the Invention] The switch substrate which invention of this invention according to claim 1 is the regular intervals from the center of predetermined [on top] in two or more sets of central switch contacts and the circumference switch contact which attach and detach by the press from the upper part, and was arranged in the equal distance position in the shape of radiation, While a heavy-gage pedestal is carried on this switch substrate, central approach on top is equipped with heavy-gage moving part in the abbreviation rectangle in which only the size more nearly predetermined than a central salient prepared the low circumference salient for the central salient in circumference approach. The supporter with which a nose of cam contacts the mid-position of the inferior surface of tongue of this moving part on a switch substrate It has the press section which opened the lot of the above-mentioned central switch contact and a circumference switch contact, and the predetermined interval in the ends position at the bottom, and countered it, respectively. While wearing the whole upper surface of the driver made from a spring material which has two or more mechanical components connected with the downward pedestal in the first connection section of the shape of an abbreviation dome of the thin meat lengthened from the periphery, and this driver and having the moving part of each above-mentioned mechanical component, and a predetermined interval It connects with the downward heavy-gage periphery section in the second connection section of the shape of an abbreviation dome of the thin meat of the periphery lower part. Since it considers as the multi-direction operation switch which consists of a multi-direction operation switch which consists of an operation object made from a spring material by which this periphery section was carried on the pedestal of the above-mentioned driver and the supporter is formed in the mid-position of the inferior surface of tongue of the moving part of each mechanical component of a driver, When a central site is pressed rather than a central salient at the time of press operation of an operation object, at least one of two or more sets of the central switch contacts When a circumference side is pressed, while the circumference switch contact near the press position turns on and both sides prevent an ON state and a bird clapper simultaneously Since an operation object can be smoothly returned by large stability when press is removed, it has operation that the multi-direction operation switch in which the stable operation is possible can be obtained.

[0019] Invention according to claim 2 is set to invention according to claim 1. near the mechanical component of a driver Make the upper surface contact the inferior surface of tongue of an operation object, and the lobe of the shape of a heavy-gage pillar which can move up and down the range which does not bar operation of a mechanical component is prepared. The periphery lower part of this lobe is connected with a pedestal by the third connection section which carries out elastic buckling by the shape of an abbreviation dome of thin meat at the time of vertical movement. It has operation that a clear feeling of moderation is obtained while bigger stability is acquired at the time of press operation of the operation object of this lobe upper part, and the multi-direction operation switch with a better feeling of operation can be obtained.

[0020] Invention according to claim 3 is set to invention according to claim 2. a lobe Since it allots each middle angular position of two or more mechanical components arranged in the shape

of radiation and elastic buckling and the lobe to restore can be arranged with sufficient balance under the operation object by press operation of a mechanical component and the same number Furthermore, it has operation that a clear feeling of moderation is obtained by a big press operating physical force and big stability, and the row, and the multi-direction operation switch with more high practicality can be obtained.

[0021] Invention according to claim 4 is set to invention of any one publication of the claim 1-3. Two or more sets of central switch contacts and the circumference switch contact on a switch substrate All open the stationary contact of a couple on a switch substrate, and arrange a predetermined interval, and a traveling contact is formed in the press subordinate side of the moving part of a driver at one, and it is constituted. by press operation of an operation object Since a traveling contact can constitute the switch contact of a method which short-circuits between stationary contacts Since part mark can be lessened by forming a traveling contact at one on the switch substrate which used the stationary contact for the driver for the printed circuit board etc., it has operation that the multi-direction operation switch that an assembly is easy and cheap can be obtained.

[0022] Invention according to claim 5 is set to invention of any one publication of the claim 1-3. Two or more sets of central switch contacts and the circumference switch contact on a switch substrate The upper contact under a flexible insulating substrate, In a predetermined interval, opposite arrangement is opened and carried out and the lower contact on the upper surface of an insulating substrate put on a switch substrate top or this is constituted. by press operation of an operation object Since the so-called membrane switch contact which the press section of the undersurface ends of the moving part of a driver presses an upper contact, and contacts at a lower contact, respectively can be constituted, it has operation that the multi-direction operation switch with the high contact reliability excellent in protection-against-dust nature can be obtained.

[0023] Invention according to claim 6 is set to invention of any one publication of the claim 1-5. Two or more sets of central switch contacts on a switch substrate are constituted in the shape of an abbreviation ring so that it may become a common contact. Since any 1 set of two or more sets of central switch contacts can form in the shape of an abbreviation ring as a common switch contact which should just be turned on, a switch contact can be constituted easily and it has operation that the multi-direction operation switch that manufacture is easy and cheap can be obtained.

[0024] Invention according to claim 7 is set to invention of any one publication of the claim 1-6. With [consider switch structure of the central switch contact on a switch substrate, and a circumference switch contact as different composition, and / a central switch contact and a circumference switch contact] respectively different switch structure Since an operating physical force, an operation stroke, etc. are changeable, it has operation that the multi-direction operation switch which has the feeling of operation clearly classified at the time of the press operation by the side of the center section of the operation object and a periphery can be obtained.

[0025] Invention according to claim 8 The multi-direction operation switch of any one publication of a claim 1-7, It is allotted to one or more switch contacts prepared in the way

extension outside the switch substrate of this multi-direction operation switch, and each upper part of the switch contact. It considers as the compound switch which consists of one or more push button switches equipped with the way mechanical component outside the shape of a heavy-gage pillar connected with the pedestal of the above-mentioned multi-direction operation switch in the fourth connection section of the shape of an abbreviation dome of the thin meat of the periphery lower part. By constituting a compound switch using the driver which formed the way mechanical component in one, and the switch substrate which has a switch contact corresponding to both them outside the mechanical component of the multi-direction operation switch, and one or more push button switches It has operation that a cheap and compact compound switch can be obtained.

[0026] Hereafter, the gestalt of operation of this invention is explained using drawing 1 - drawing 10 .

[0027] (Gestalt 1 of operation) a cross section when a cross section [perspective diagram / isomerism solution] when the cross section of the multi-direction operation switch by the gestalt of operation of the first of this invention and drawing 2 carry out drawing 1 and drawing 3 carries out press operation of the center section of this operation object, and drawing 4 carry out press operation of the periphery of this operation object, and drawing 5 -- ** -- it is the plan of the switch substrate which has the stationary contact of another composition

[0028] Stationary-contact 11A for the central switch contacts of 4 sets of couples which 11 is the switch substrate which consists of an insulating substrate in this drawing, and carried out circuitry beforehand so that a contact might be in an ON state, if any 1 set was short-circuited in the center of the upper surface, Stationary-contact 11B of 4 sets of couples for circumference switch contacts which are the regular intervals of 90 degrees and were allotted to the circumference of this stationary-contact 11A in the shape of radiation in the equal distance position is formed in the circuit section (not shown) and one by carbon ink, the metallic foil, etc.

[0029] And 12 is the driver which consists of spring materials, such as rubber and an elastomer. It has the heavy-gage pedestal 13 laid on the switch substrate 11, and 14 is moving part. It consists of a heavy-gage abbreviation rectangle allotted by confronting each other on stationary-contact 11A and 11B. It has the circumference salient 16 only with a predetermined size lower than the central salient 15 to circumference approach for the central salient 15 in central approach on top. In the mid-position at the bottom, a nose of cam in a circular cross section the supporter 17 of stationary contacts 11A and 11B which contacts on the switch substrate 11 mostly in middle A nose of cam has the press sections 18 and 19 of a plane, respectively in the position which stood face to face against the ends position at the bottom with stationary contacts 11A and 11B. The traveling contacts 18A and 19B which carried out printing formation with carbon material etc. on the undersurface of these press sections 18 and 19 Prepared so that stationary contacts 11A and 11B and the predetermined interval D may be opened and it may confront each other, the periphery of moving part 14 is connected with the downward pedestal 13 in the light-gage abbreviation dome-like first connection section 20, and serves as a mechanical component 21.

[0030] Furthermore, 22 is the operation object which consists of spring materials, such as rubber

and an elastomer. It is wrap heavy-gage disc-like about the whole upper surface of a driver 12. an inferior surface of tongue the upper surface of the central salient 15 of moving part 14, and the predetermined interval E It has the circumference salient 16 and the predetermined interval F, respectively, the upper surface is equipped with direction mark of four places 22B, and it connects with the downward heavy-gage periphery section 24 in the second connection section 23 of the shape of a light-gage abbreviation dome of the periphery lower part, and is carried on the pedestal 13 of a driver 12.

[0031] Moreover, it is a resin case, and 25 has opening 25A which makes the operation object 22 project upwards, and cylindrical salient 25B extended in an inside lower part, and the operation object 22 is positioned by this salient 25B by notch 24A allotted to the periphery section 24, and it is being put and fixed between the switch substrates 11 with the pedestal 13 of a driver 12.

[0032] In addition, the interval D of traveling contacts 18A and 19B and stationary contacts 11A and 11B is larger than the interval E of the inferior surface of tongue of the operation object 22, and the upper surface of the central salient 15 of a driver 12, and the interval F of the inferior surface of tongue of the operation object 22 and the circumference salient 16 of a driver 12 is set up more greatly than an interval D.

[0033] That is, it is the interval F> interval D> interval E.

[0034] If press operation of the center section of the operation object 22 is carried out from the center valve position of drawing 1 which is a normal state at drawing 3 as an arrow shows, while the second connection section 23 will bend in the above composition In contact with the central salient 15 upper surface of the moving part 14 of four drivers 12, the inside of the first connection section 20 mainly bends, and it moves below on the inferior surface of tongue of the operation object 22. Although traveling contact 18A of press section 18 inferior surface of tongue will short-circuit any one of the 4 sets of stationary-contacts 11A on the switch substrate 11 and a central switch contact will be in an ON state Since four drivers 12 use a supporter 17 as the supporting point in the stationary-contact 11B 4 sets by the side of the circumference side, a central site falls at this time and a circumference side goes up up, the circumference switch contact is an OFF state.

[0035] Furthermore, if the press more than predetermined is applied to the operation object 22, when the nose of cam of the supporter 17 of moving-part 14 inferior surface of tongue of what is lost is in contact with the switch substrate 11, the interval of the operation object 22 and the circumference salient 16 This supporter 17 serves as the supporting point, since a predetermined interval with stationary-contact 11B is maintained without suppressing the press by the side of the press section 19, and being pushed below, traveling contact 19B does not short-circuit stationary-contact 11B, and a circumference switch contact can maintain an OFF state.

[0036] And if the press to the operation object 22 is removed, while the operation object 22 returns upwards smoothly, according to the elastic stability of the second connection section 23, the press to the moving part 14 of a driver 12 is also released, and moving part 14 will move upwards according to the elastic stability of the first connection section 20, and will return to a center valve position.

[0037] Next, if press operation of near [one] the direction mark 22B of the operation object 22 is carried out at drawing 4 as an arrow shows It follows on concentrating in the direction where one side of the second connection section 23 bent, another side was extended, and the operation object 22 whole was pressed. The circumference salient 16 upper surface of moving part 14 is pressed by the undersurface of the operation object 22, and the outside of the first connection section 20 mainly bends. Although the press section 19 will rotate to the switch substrate 11 side by using a supporter 17 as the supporting point, traveling contact 19B will short-circuit stationary-contact 11B on the switch substrate 11 and a circumference switch contact will be in an ON state Since the press section 18 side moves up by rotation which uses a supporter 17 as the supporting point at this time, traveling contact 18A does not short-circuit stationary-contact 11A, and the central switch contact has become an OFF state.

[0038] Furthermore, since a predetermined interval with stationary-contact 11A is maintained without suppressing the press by the side of the press section 18, and being pushed below when supporter 17 nose of cam of moving part 14 is in contact with the switch substrate 11 even if it applies the press more than predetermined to the operation object 22, traveling contact 18A does not short-circuit stationary-contact 11A, and a central switch contact can maintain an OFF state.

[0039] And if the press to the operation object 22 is removed, while the operation object 22 will return upwards smoothly according to the elastic stability of the second connection section 23, the press to the moving part 14 of a driver 12 is also released, and according to the elastic stability of the first connection section 20, moving part 14 moves upwards and returns to a center valve position.

[0040] Moreover, even when the press position to the operation object 22 carries out press operation of the center section, it carries out press operation of a circumference side or the periphery and it shifts to a central site, the supporter 17 of moving part 14 is used as the supporting point. Since the press force to moving part 14 works to a central site at the time of the press operation near the center section and works to a circumference side at the time of the press operation near the periphery, let almost certainly the switch contact corresponding to the meant press actuated valve position be an ON state.

[0041] Thus, according to the gestalt of this operation, it sets at the time of press operation of an operation object. When a center section is pressed and a central switch contact presses a periphery, while a circumference switch contact turns on and both sides can prevent an ON state and a bird clapper simultaneously Since an operation object can be smoothly returned by elastic stability when press is removed, the stable operation is possible and the cheap multi-direction operation switch with big stability can be obtained.

[0042] In addition, although circuitry should be beforehand carried out in the above-mentioned explanation so that a contact might be in an ON state when the stationary contact for central switch contacts serves as a couple by 4 sets and short-circuited any 1 set If common stationary-contact 26A for central switch contacts shall be arranged in the shape of a ring on the switch substrate 26 and stationary-contact 26B for 4 sets of circumference switch contacts shall have been arranged to the circumference as shown in drawing 5 A central switch contact can be

simplified and the cheaper multi-direction operation switch can be obtained.

[0043] The resin case 25 with [drawing 6 is the cross section of the multi-direction operation switch by the form of operation of the second of this invention, and] opening, (Form 2 of operation) Although it is the same as that of the case of the form 1 of operation about consisting of a driver 33 made from a spring material which consists of moving part 31 and a pedestal 32, and an operation object 22 made from a heavy-gage disc-like spring material, or turning on and off of a switch contact being performed by press operation of the operation object 22 The composition of a switch contact differs.

[0044] Namely, 42 and 43 are flexible insulating substrates, it is carried on the switch substrate 41 and thickness is products made from a film, such as a polyethylene terephthalate of two sheets which has the flexibility around 100 micrometers. It is what constitutes a central switch contact and a circumference switch contact with the membrane switch 45 stuck through the insulating spacer 44. Counter the flexible insulating substrate 42 of the moving-part 31 lower part top of a driver 33 in the upper contacts 42A and 42B, the lower contacts 43A and 43B are made to counter the lower flexible insulating substrate 43, respectively, and it prepares.

[0045] And as operation in this case, by carrying out press operation of the predetermined position of a center section or the periphery of the operation object 22, the press section 34 of the moving-part 31 undersurface of a driver 33 or the undersurface of 35 presses upper contact 42A or 42B, makes lower contact 43A or 43B contact, and considers as an ON state.

[0046] Thus, since it is considering as. the membrane switch composition which carried out opposite arrangement of an upper contact and the lower contact inside the flexible insulating substrate of two sheets on which the switch contact was stuck according to the gestalt of this operation, the multi-direction operation switch with the high contact reliability excellent in protection-against-dust nature can be obtained.

[0047] (Form 3 of operation) The plan of the multi-direction operation switch according [drawing 7] to the form of operation of the third of this invention, a cross section [in / the X-X line of drawing 7 / in drawing 8], and drawing 9 are isomerism solution perspective diagrams.

[0048] In this drawing, although the resin case 25 with opening which makes the switch substrate 11 with stationary contacts 11A and 11B, the disc-like operation object 22 heavy-gage at the product made from a spring material, and the operation object 22 project upwards is constituted like what is depended on the form 1 of operation, the configurations of a driver 51 differ.

[0049] That is, the lobe 55 of the shape of a heavy-gage pillar by which the periphery lower part was connected with the pedestal 54 in the third connection section 53 of the shape of an abbreviation dome of thin meat so that elastic buckling might be carried out at the time of vertical movement is formed in each middle of four mechanical components 52 allotted to the driver 51 at one.

[0050] And the upper surface of this lobe 55 is in contact with the inferior surface of tongue of the operation object 22, and has composition which is the equiangular distance of 90 degrees and is arranged in the middle of four mechanical components 52 at direction mark 22B of a

radiation-like center and the operation object 22, and the abbreviation equal distance.

[0051] If press operation of the center section of the operation object 22 is carried out, while the moving part 56 of a mechanical component 52 will move below in the above composition from the center valve position of drawing 8 which is a normal state The lower third connection section 53 bends for a while, and the lobe 55 allotted to the mechanical component 52 also moves caudad. If traveling contact 57A of press section 57 inferior surface of tongue of moving part 56 will short-circuit stationary-contact 11A, and a central switch contact will be in an ON state and press operation of near [one] the direction mark 22B is carried out, while the press section 58 of moving part 56 will move caudad The lobe 55 of the method of both sides of the pressed moving part 56 will also bend greatly with a feeling of moderation, the third connection section 53 will move it caudad, traveling contact 58B of press section 58 inferior surface of tongue will short-circuit stationary-contact 11B, and a circumference switch contact will be in an ON state.

[0052] And if the press to the operation object 22 is removed, in addition to one's elastic return force, according to the elastic stability of a mechanical component 52, and the elastic stability of the third connection section 53 of a lobe 55, the operation object 22 will move upwards and will return to a center valve position.

[0053] Thus, since the elastic stability of a lobe 55 can be acquired at the time of press operation of the periphery of the operation object 22 in addition to the elastic stability of a mechanical component 52, while the bigger return force is acquired according to the gestalt of this operation, a clear feeling of moderation is obtained, and the multi-direction operation switch with a better feeling of operation can be obtained.

[0054] In addition, although it is what formed the mechanical component 52 and the lobe 55 of the same number and being explained by the above-mentioned explanation, the lobe 55 of what is prepared only in a piece place or two places which confront each other if needed being used is natural.

[0055] (Gestalt 4 of operation) Drawing 10 is the decomposition perspective diagram of the compound switch by the gestalt of operation of the fourth of this invention, and two or more push button switches are formed on the same switch substrate as the multi-direction operation switch by the gestalt 3 of the above-mentioned operation.

[0056] Namely, although it is the same as that of the case of the gestalt 3 of operation that the driver 65 which consists of the stationary contacts 61A and 61B on the switch substrate 61, a mechanical component 63 on a pedestal 62, and a lobe 64, and the heavy-gage disc-like operation object 66 are contained in the resin case 67, and the multi-direction operation switch is constituted The way moving part 68 is formed above the pedestal 62 extended from the multi-direction operation switch outside the shape of two or more heavy-gage pillar. While the way mechanical component 70 is formed in one outside the plurality connected with the downward pedestal 62 in the fourth connection section 69 of the shape of an abbreviation dome of the thin meat of the periphery lower part The upper part of the method moving part 68 of outside is projected to the upper part of opening 67A of the resin case 67, and has two or more traveling contacts (not shown) in the inferior surface of tongue, respectively.

[0057] And corresponding to each above-mentioned traveling contact, two or more sets of a pair each stationary-contacts 61C is prepared in the upper surface of the switch substrate 61 extended from the multi-direction operation switch, and two or more push button switches are constituted.
[0058] In the above composition, if the fourth connection section 69 will bend, a traveling contact will short-circuit stationary-contact 61C, and it will be made an ON state, if press operation of the method moving part 68 of outside which projected from opening 67A of the resin case 67 is carried out, and press is removed, a traveling contact will separate from stationary-contact 61C according to the elastic stability of the fourth connection section 69, and it will return to an OFF state.
[0059] Thus, according to the gestalt of this operation, outside a mechanical component and one or more push button switches, while being able to constitute the multi-direction operation switch and push button switch which carried out the driver and switch substrate which formed the way mechanical component in one in common in one resin case, various functions can be given and a cheap and compact compound switch can be obtained.
[0060] Moreover, although the forms 1-4 of the above operation explained what is made to short-circuit the stationary contact which formed the traveling contact in the undersurface of a driver and was formed in the switch substrate upper surface, and attaches and detaches a switch contact, and the composition using the membrane switch contact Consider as the composition which arranges the traveling contact made from an elastic sheet metal on the stationary contact formed in the upper surface of a switch substrate, and is pressed in respect of the press subordinate of the moving part of a driver, or Or the push-on switch of the above-mentioned traveling contact made from an elastic sheet metal or a simple substance is arranged only to the stationary contact for circumference switch contacts, and even if it constitutes the feeling of operation of a central switch contact and a circumference switch contact as a different thing, of course, the same effect as the forms 1-4 of the above-mentioned implementation is done so.
[0061]
[Effect of the Invention] According to this invention, as mentioned above on the switch substrate which has two or more sets of central switch contacts, and a circumference switch contact The press section of the undersurface corresponding to each switch contact, and a central salient on top, By carrying the driver made from a spring material which has two or more moving part equipped with the circumference salient in one, and forming the supporter which contacts a switch substrate among both the above-mentioned switch contacts in the undersurface of each moving part Since this supporter should become the supporting point and it should become independent about operation of the press section, respectively Even if the press position when carrying out press operation of the center section or periphery of an operation object allotted above the driver shifts somewhat Only a central switch contact or a circumference switch contact can be made to attach and detach certainly. The advantageous effect that the contact reliability of a switch contact is high and the cheap multi-direction operation switch with which it has a good feeling of operation with big stability, and the compact compound switch using this can be obtained is acquired.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The cross section of the multi-direction operation switch by the gestalt of operation of the first of this invention

[Drawing 2] Isomerism solution perspective diagram

[Drawing 3] The cross section when carrying out press operation of the center section of this operation object

[Drawing 4] The cross section when carrying out press operation of the periphery of this operation object

[Drawing 5] ****** -- the plan of the switch substrate which has the stationary contact of composition

[Drawing 6] The cross section of the multi-direction operation switch by the gestalt of operation of the second of this invention

[Drawing 7] The plan of the multi-direction operation switch by the gestalt of operation of the third of this invention

[Drawing 8] The cross section in the X-X line of drawing 7

[Drawing 9] Isomerism solution perspective diagram

[Drawing 10] The decomposition perspective diagram of the compound switch by the gestalt of operation of the fourth of this invention

[Drawing 11] The cross section of the conventional multi-direction operation switch

[Drawing 12] Isomerism solution perspective diagram

[Drawing 13] The cross section when carrying out press operation of the center section of this operation object

[Drawing 14] The cross section when carrying out press operation of the periphery of this operation object

[Description of Notations]

11, 26, 41, 61 Switch substrate

11A, 11B, 26A, 26B, 61A, 61B, 61C Stationary contact

12, 33, 51, 65 Driver

13, 32, 54, 62 Pedestal

14, 31, 56 Moving part

15 Central Salient

16 Circumference Salient

17 Supporter

18, 19, 34, 35, 57, 58 Press section

18A, 19B, 57A, 58B Traveling contact

20 First Connection Section

21, 52, 63 Mechanical component

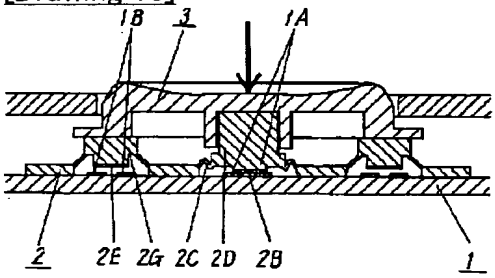
22 Operation Object
22B Direction mark
23 Second Connection Section
24 Periphery Section
24A Notch
25 67 Resin case
25A, 67A Opening
25B Salient
42 43 Flexible insulating substrate
42A, 42B Top contact
43A, 43B Bottom contact
44 Insulating Spacer
45 Membrane Switch
53 Third Connection Section
55 64 Lobe
68 Method Moving Part of Outside
69 Fourth Connection Section
70 Method Mechanical Component of Outside

[Translation done.]

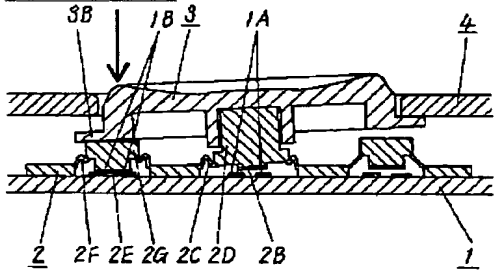
* NOTICES *

DRAWINGS

[Drawing 13]

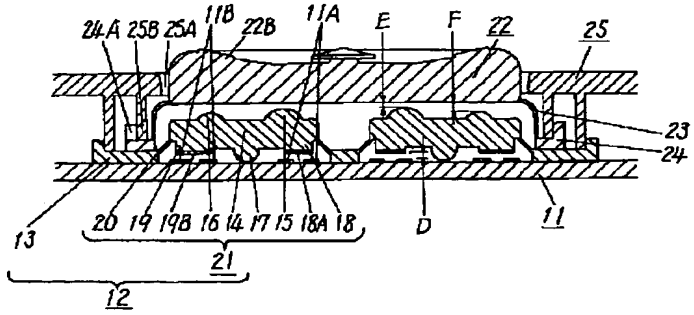


[Drawing 14]

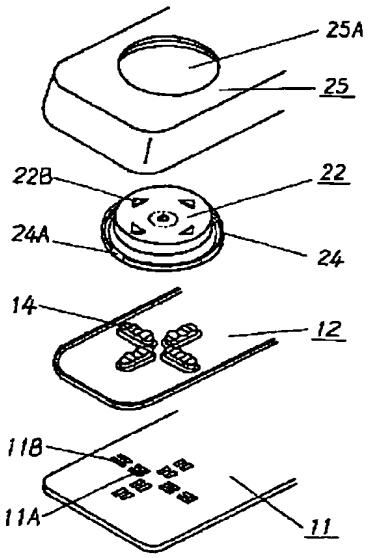


[Drawing 1]

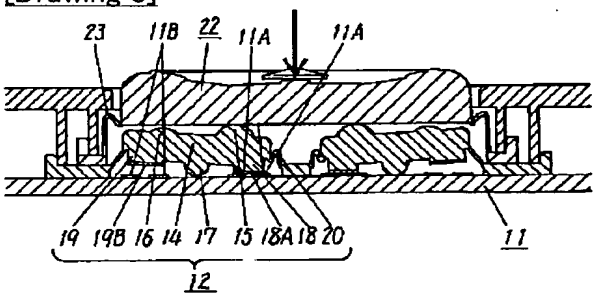
11	スイッチ基板	15	中央突起	20	第一連結部	24	周縁部
11A, 11B	固定接点	16	周辺突起	21	駆動部	24A	切欠き部
12	駆動体	17	支持部	22	操作体	25	樹脂ケース
13	基台部	18, 19	押圧部	22B	方向マーク	25A	開口
14	可動部	18A, 19B	可動接点	23	第二連結部	25B	突起



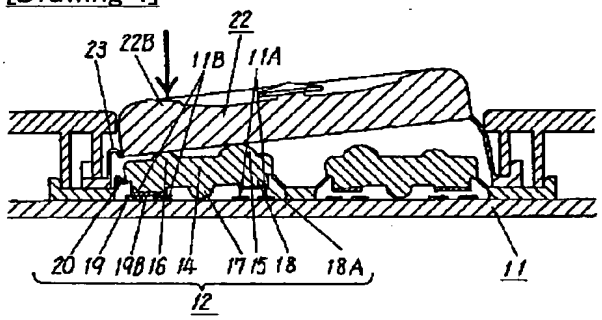
[Drawing 2]



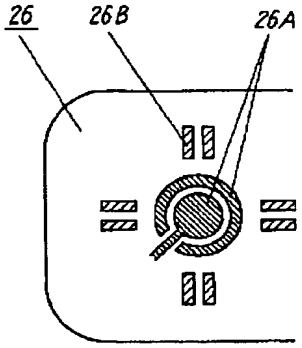
[Drawing 3]



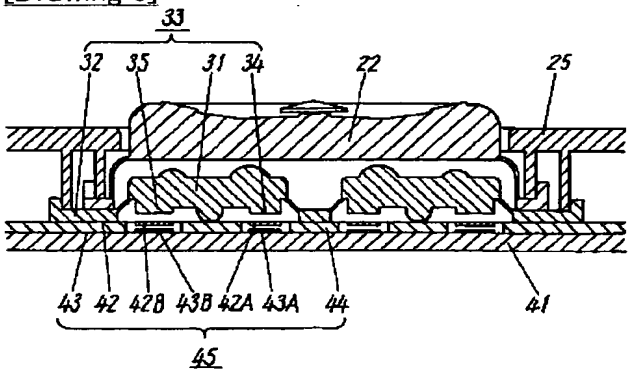
[Drawing 4]



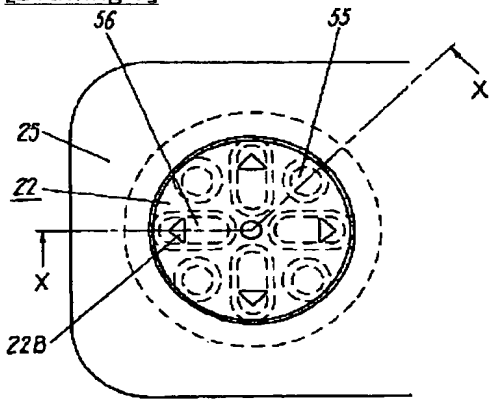
[Drawing 5]



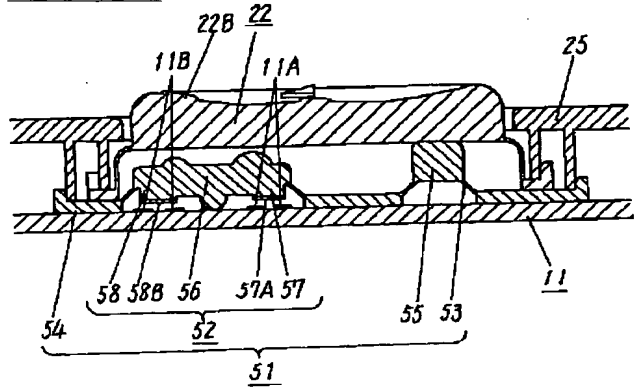
[Drawing 6]



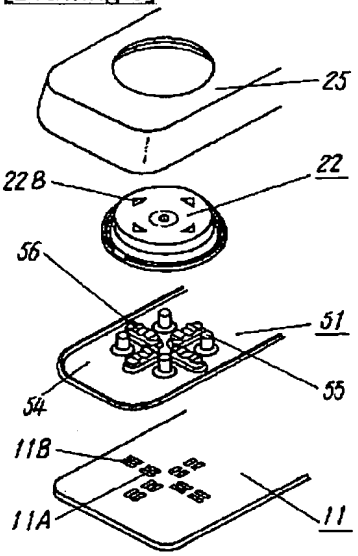
[Drawing 7]



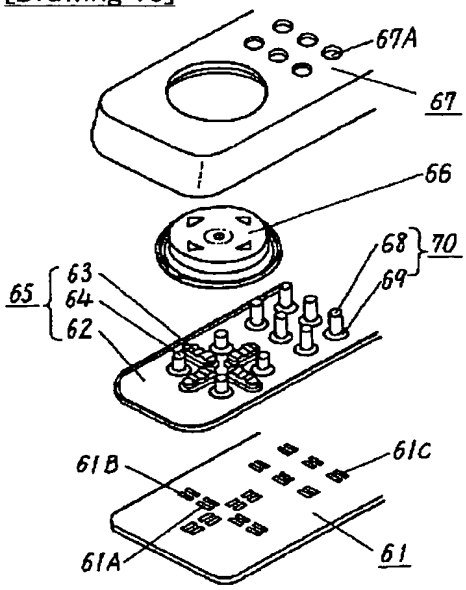
[Drawing 8]



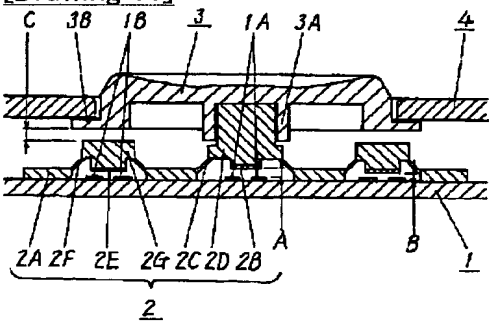
[Drawing 9]



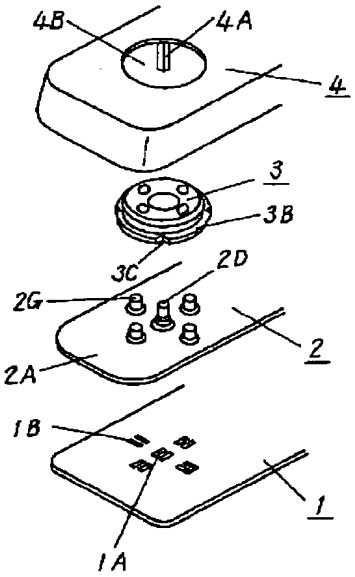
[Drawing 10]



[Drawing 11]



[Drawing 12]



[Translation done.]